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(54) Title: COATING AND CURING APPARATUS AND METHODS

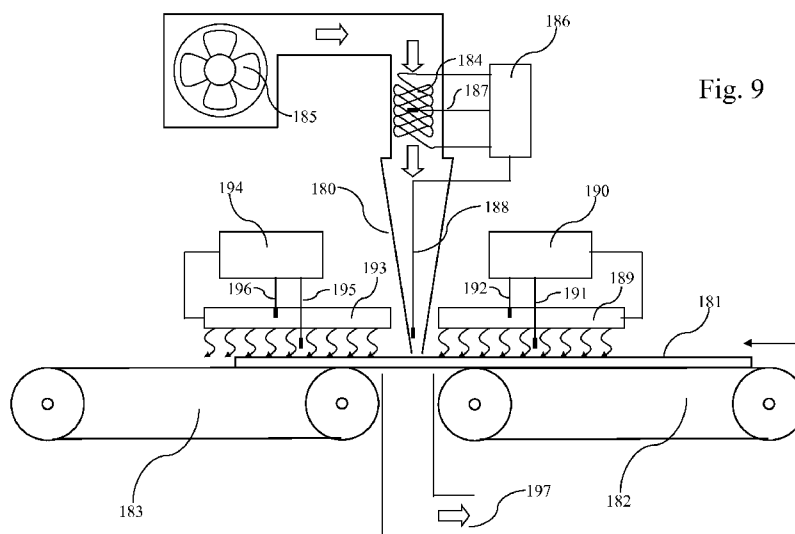


Fig. 9

(57) Abstract: Disclosed are coating apparatus including flow coating and roll-coating that may be used for uniform sol-gel coating of substrates such as glass, solar panels, windows or part of an electronic display. Also disclosed are methods for substrate preparation, flow coating and roll coating. Lastly systems and methods for skin curing sol-gel coatings deposited onto the surface of glass substrates using a high temperature air-knife are disclosed.





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A. CLASSIFICATION OF SUBJECT MATTER**B05C 1/08(2006.01)i**

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

B05C 1/08; H05K 3/22; H05K 3/10; B05C 11/00; B05C 1/06; B05C 3/02; B05C 13/00

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Korean utility models and applications for utility models

Japanese utility models and applications for utility models

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

eKOMPASS(KIPO internal) & Keywords: coating, curing, conveyor, processor, air knife, sensor, temperature

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	US 5038706 A (MORRIS, GILBERT V.) 13 August 1991 See column 3, line 14 - column 4, line 58; and figure 1A.	1-30
Y	US 4608941 A (MORRIS, GILBERT V.) 02 September 1986 See column 3, lines 31 - 56, column 7, lines 10 - 24.	1-18, 21
Y	US 2003-0200918 A1 (NAGASHIMA, SHINJI et al.) 30 October 2003 See claims 1, 8-9; and paragraphs [0041]-[0042], [0053].	19-30
A	US 5863330 A (ALAIN LE RICHE, FREDERIC et al.) 26 January 1999 See claims 1, 7-8; column 10, line 48 - column 11, line 25, column 18, lines 6 - 20; and figures 1-2, 13.	1-30
A	US 2002-0129764 A1 (JACOBSON, JOHN R. et al.) 19 September 2002 See paragraphs [0050]-[0053]; and figures 5-6.	1-30

 Further documents are listed in the continuation of Box C. See patent family annex.

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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 05038706 A	13/08/1991	EP 0343616 A2	29/11/1989
		EP 0343616 B1	15/03/1995
		JP 06009298 B2	02/02/1994
		JP 1884426 C	10/11/1994
		JP 2148883 A	07/06/1990
		US 04903631 A	27/02/1990
		US 05209782 A	11/05/1993
US 04608941 A	02/09/1986	None	
US 2003-0200918 A1	30/10/2003	JP 03-333748 B2	15/10/2002
		JP 2000-124206 A	28/04/2000
		JP 2000-124207 A	28/04/2000
		KR 10-0567493 B1	03/04/2006
		KR 10-2000-0029107 A	25/05/2000
		TW 432527 B	01/05/2001
		US 6673155 B2	06/01/2004
US 05863330 A	26/01/1999	AU 1995-29708 B2	04/03/1999
		AU 1996-77202 B2	06/07/2000
		AU 1998-59423 B2	21/10/1999
		AU 1998-90470 B2	09/03/2000
		AU 1998-90470 C	04/03/1999
		EP 0776273 A1	21/10/1998
		EP 0776273 B1	20/09/2000
		EP 0776274 A1	03/07/2002
		EP 0776274 B1	02/10/2002
		EP 0776274 B9	15/03/2006
		EP 0879713 A1	25/11/1998
		EP 0879713 B1	07/11/2001
		EP 0881982 A1	16/06/1999
		EP 0882602 A2	09/12/1998
		EP 0882602 A3	23/12/1998
		EP 0882602 B1	07/11/2001
		EP 1234682 A2	28/08/2002
		EP 1234682 A3	02/10/2002
		EP 1234682 B1	22/02/2006
		EP 1234683 A2	28/08/2002
		EP 1234683 A3	02/10/2002
		EP 1234683 B1	19/04/2006
		EP 1531061 A2	18/05/2005
		EP 1531061 A3	22/11/2006
		JP 03772196 B2	10/05/2006
		JP 10-504239 A	28/04/1998
		JP 10-504240 A	28/04/1998
		JP 2000-505350 A	09/05/2000
		KR 10-0352325 B1	22/11/2002
		KR 10-1997-0704584 A	06/09/1997
		KR 10-1999-0082493 A	25/11/1999

INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.

PCT/US2014/015167

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
		US 05849358 A	15/12/1998
		US 05851592 A	22/12/1998
		US 05868838 A	09/02/1999
		US 05916630 A	29/06/1999
		US 05958135 A	28/09/1999
		US 05972113 A	26/10/1999
		US 06040006 A	21/03/2000
		US 06074704 A	13/06/2000
		US 6517900 B1	11/02/2003
		US 6551654 B1	22/04/2003
		WO 96-05065 A1	22/02/1996
		WO 96-05066 A1	22/02/1996
		WO 97-29985 A1	21/08/1997
US 2002-0129764 A1	19/09/2002	BR 0207897 A	27/07/2004
		CA 2441166 A1	31/10/2002
		CA 2441166 C	09/08/2011
		CA 2722667 A1	31/10/2002
		CA 2722667 C	27/05/2014
		CN 1496286 A	12/05/2004
		CN 1496286 C	18/10/2006
		EP 1368133 A1	10/12/2003
		JP 2004-525763 A	26/08/2004
		KR 10-0815301 B1	19/03/2008
		KR 10-2003-0090666 A	28/11/2003
		US 2010-0047530 A1	25/02/2010
		US 7669547 B2	02/03/2010
		US 8445073 B2	21/05/2013
		WO 02-085534 A1	31/10/2002